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Claims

1. Beta titanium alloy containing (in mass %):

V: 10 to 17%,
Fe: 2 to 5%,
Al: 2 to 5%,
Mo: 0.1 to 3%,

and optionally one or more alloy elements from the group of Sn, Si, Cr, Nb, Zr according to the following proportions:

Sn: 0.1 to 3%,
Si: 0.1 ≤ 2%,
Cr: ≤ 2%,
Nb: ≤ 2%,
Zr: ≤ 2%,

wherein the beta titanium alloy may additionally comprise contents of C and of elements from the group of the lanthanides,

and as the remainder Ti and inevitable impurities.

2. Beta titanium alloy containing (in mass %):

V: 10.00 to 17.00%,
Fe: 2.00 to 5.00%,
Al: 2.00 to 5.00%,

Mo: 0.10 to 3.00%,

and optionally one or more alloy elements from the group of Sn, Si, Cr, Nb, Zr according to the following proportions:

Sn: 0.10 to 3.00%,
Si: 0.10 to 2.00%,
Cr: ≤ 2.00%,
Nb: ≤ 2.00%,
Zr: ≤ 2.00%,

and as the remainder Ti and inevitable impurities.

3. Beta titanium alloy according to any one of the preceding claims, containing 12 to 17 mass % V.

4. Beta titanium alloy according to any one of the preceding claims, containing 0.5 to 3 mass % Mo.

5. Beta titanium alloy according to any one of the preceding claims, containing 0.5 to 3 mass % Sn.

6. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient temperature it has a yield point $R_{p0.2}$ of at least 1,400 MPa.

7. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient temperature it has a tensile strength R_m of at least 1,500 MPa.

8. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient temperature it has a plastic strain $\epsilon_{p0.2}$ of more than 4%.

9. Beta titanium alloy according to any one of the preceding claims, characterised in that its density ρ does not exceed 4.8 g/cm^3.

10. Method for manufacturing a product produced from a beta titanium alloy, comprising the following steps:

- melting a beta titanium melt having the composition according to any one of claims 1 to 9 to form a preliminary product in block form,

- hot-forming the preliminary product,

- hot end forming the hot-formed preliminary product to form a hot end product,

- solution annealing the hot end product,

- cold-forming the hot end product to form an end product,

- curing treatment of the end product.

11. Method according to claim 10, characterised in that the hot end forming process is carried out as a hot-rolling process.

12. Method according to claim 11, characterised in that the hot-rolling process is followed by a coiling process.

13. Method according to claims 10 to 12, characterised in that the alloy elements V, Fe and Al are added by alloying in the form of a master alloy.

14. Method according to any one of claims 10 to 13, characterised in that the preliminary products are rounded blocks, which are hot-formed during the hot-forming process to form billets or mill bars.

15. Method according to any one of claims 10 to 14, characterised in that the hot end product is a wire or a metal sheet.

16. Method according to any one of claims 11 to 15, characterised in that the hot end product is solution annealed after the coiling process.

17. Method according to claim 16, characterised in that the solution annealed hot end product is cold-formed.

18. Semi-finished product produced from a beta titanium alloy having the composition according to any one of claims 1 to 9.

19. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of components that are used in the temperature range from -196°C to 300°C.

20. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of vehicle components.

21. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of components used in plant or apparatus engineering.

22. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of sports equipment.